9. FIRST RECORD OF *PROTOBOTHROPS JERDONII XANTHOMELAS* (GÜNTHER, 1889) FROM EAGLENEST WILDLIFE SANCTUARY, INDIA

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While conducting a herpetofaunal survey of the Eaglenest Wildlife Sanctuary, West Kameng district, Arunachal Pradesh, India, during 2006-2008, we encountered four specimens of *Protobothrops jerdonii*. Two (one male, other sex not determined) of the four specimens were found within a gap of twenty minutes at 0930 hrs and 0950 hrs, respectively, at Lama Camp (27.16° N; 92.46° E; 2,350 m) on June 03, 2006. The third and fourth individuals (both males) were also caught at Lama Camp, on June 05 and 06, 2008, respectively. Morphological characters, measurements and colour pattern of all four snakes were recorded and thereafter they were photographed. Three specimens were released and a male specimen (collected on June 06, 2008) was deposited at the State Forest Research Institute, Itanagar, Arunachal Pradesh (S.F.R.I.). On comparing descriptions and keys in Whitaker and Captain (2004), Smith (1943) and Pope (1935), the snake was identified as *Protobothrops jerdonii*.

Gumprecht *et al.* (2004) recognised 3 subspecies of *P. jerdonii*. Analysing scalation data, body colour and pattern, the snakes were identified as *P.j. xanthomelas* commonly referred to as Jerdon's Red-spotted Pit Viper. This subspecies differs from the nominate *P.j. jerdonii* and *P.j. bourreti* in having a differing range of ventrals – 176-188, subcaudals – 54-67 (both fide table – p. 14), and colour pattern of dorsum – predominantly comprised of yellow scales marked with black; always with a dorsal series of rhomboidal or oval brownish-red (usually) or reddish-brown spots (sometimes), some of which join to alternate along the midline of the back (description from images – pp: 129-131). Note: Though the specimen collected had dorsum predominantly black, some scales marked with bright/lemon yellow – almost the opposite of that described earlier, probably this individual is a dark form with the requisite "oval brownish-red spots". It matches well with the other 3 specimens that were recorded from the same area and which conform to the colour pattern in Gumprecht *et al.* (2004).

Gumprecht *et al.* (2004) record *P. jerdonii xanthomelas* from central and southern China, from Henan [*sic*], Shaanxi, Gansu, Sichuan, Guizhou, Hubei and Guangxi Provinces. Though checklists of snakes of the Indian subcontinent (Whitaker and Captain 2004; Das 2003) as well as checklists of Arunachal Pradesh (Pawar and Birand 2001; Athreya 2006)

Table 1: Scalation of *Protobothrops jerdonii xanthomelas* from Eaglenest Wildlife Sanctuary, West Kameng district, Arunachal Pradesh

Scalation	Specimen 1 (male)	Specimen 2 (unknown)	Specimen 3 (male deposited at SFRI)	Specimen 4 (male)
Ventrals	180	173	170	173
Subcaudals	25 (tail incomplete)	59	64	63
Anal	1	1	1	1
Supralabials (L/R)	7/7, 1st completely separated from nasal	7/7, 1st completely separated from nasal	7/7, 1st completely separated from nasal	7/7, 1st completely separated from nasal
Scales between Supraoculars	8	8	7	7
Scales between Internasal and Supraocular (L/R)	2/2	1/1	2/2	1/2
Snout-vent length (mm)	585	760	790	-
Tail length (mm)	43 +? (tail incomplete)	143	136	-
Ratio of tail to total body length	-	0.1583	0.1468	-

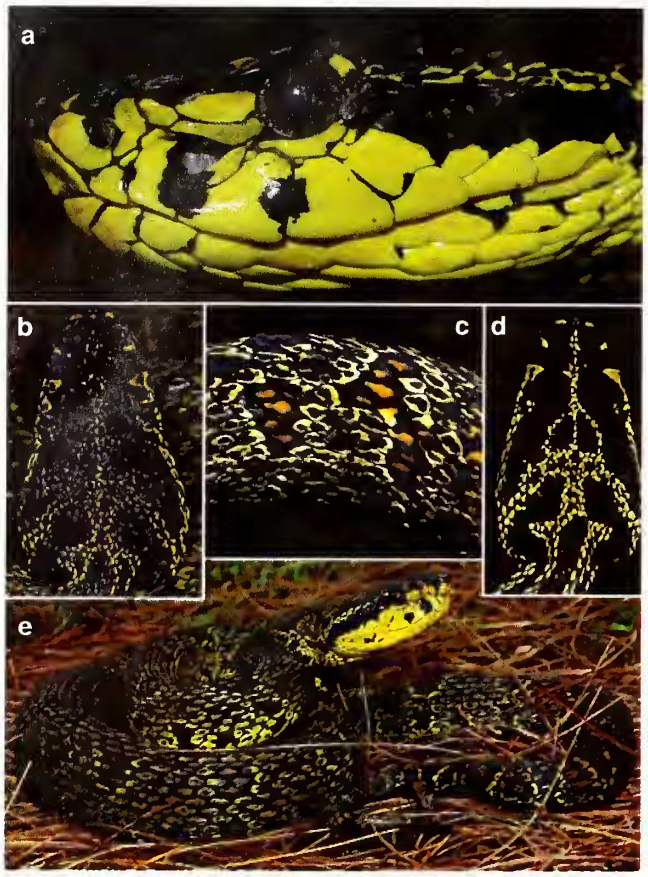

Fig. 1: *Protobothrops jerdonii xanthomelas* (a-e): a. Head (lateral aspect); b. Head (dorsal aspect, collected specimen); c. Mid-body region showing dorsal row of red blotches; d. Head (dorsal aspect); e. General body view

include *P. jerdonii*, none specifically mention this subspecies. We thus conclude this to be probably the first record of *Protobothrops jerdonii xanthomelas* from the present day boundaries of India.

Scalation and measurements are given in Table 1. The following meristic characters: number of dorsal scale rows, (one head length behind head, approximate midbody and one head length before the vent respectively), ventral scales, subcaudal scales, supralabial scales and cephalic scales between supraoculars were recorded. Ventral scales were counted as per Dowling's (1951) method. The number of subcaudals excludes the terminal scale. Specimen 2, 3 and 4 have 173, 170 and 173 ventrals respectively, a slightly lower value than the range given by Gumprecht *et al.* (2004) – 176-188.

Morphology of collected specimen: head distinctly broader than neck; body cylindrical; tail almost 1/7th of the total body length, tail tip pointed. Upper head scales small, unequal, smooth, scarcely imbricate; supraoculars large and entire; first supralabial scale entirely separated from nasal, third largest; a single row of scales between supralabials and the subocular; temporal scales smooth. Dorsal body scales strongly keeled; first dorsal body scale row on either side smooth at midbody (Fig. 1).

Colour and pattern of the collected specimen (in life): dorsum predominantly black, some scales marked with bright/lemon yellow; a dorsal series of subrhombic, irregular brownish-red blotches that are bordered with black; interstitial skin between scales black. *Top of head*: black with symmetrical obscure yellow markings. Supraoculars black with yellow markings. *Sides of head*: lemon yellow with a broad black postocular stripe barely separated from the black dorsal aspect of head by a narrow yellow stripe. Supralabial scales yellow with two black spots-one below the eye, other below the pit. *Underside of head and neck*: bright yellow. *Venter*: anteriormost ventrals dull yellow flecked with black, gradually turning to black, profusely spotted with yellow. Posterior ventrals and tail almost entirely black. *Colour and pattern of the collected specimen (after preservation)*: bright yellow of the body and head cream/dull yellow; brownish-red blotches on the dorsum black.

All the specimens were found at 2,350 m. The habitat was degraded and included nettles, ferns and a species of knee-length grass (species unknown) dominant in the area with a broken pipeline, which made the whole area wet and slushy. Of the four specimens one male (collected) was in the pre-moult condition on June 06, 2008, at 1643hrs and moulted later that evening.

Occurrence of *P.j. xanthomelas* though new to India, is not entirely unexpected as Arunachal Pradesh is adjacent to China and shares similar biotypes. Interestingly, the specimens labelled *P. jerdonii* examined by us at the Bombay Natural History (BNHS) include two specimens, BNHS-2590 (Haka-Chin Hills, Myanmar), and BNHS-2593 (Myanmar-China frontier) which match the scalation of *P.j. xanthomelas*, and suggest the presence of this subspecies in Myanmar – a wider distribution than is currently known. However, fresh collections from Myanmar would be desirable to eliminate the possibility of incorrect locality data. The record of this subspecies from Lama Camp (West Kameng district, Arunachal Pradesh, India) is a range extension of approximately 1,200 km south-west from Sichuan in China – the nearest area where *P.j. xanthomelas* has been previously recorded (Gumprecht *et al.* 2004).

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10. REPORT ON MASS MORTALITY OF FROGS AT SON CHIRIYA WILDLIFE SANCTUARY, GWALIOR, INDIA

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Complete disappearance of amphibian populations in different parts of the world has been reported since 1950 and the frequency of such reports increased sharply during the 1990s (Kiesecker *et al.* 2001; Harp and Petranka 2006). Currently, the rate at which amphibians are going extinct far exceeds the rate for any other vertebrate taxa in the world (Stuart *et al.* 2004). Loss of habitat, introduction of exotic species and exploitation for food, and pet trade are the key threats (Stuart *et al.* 2004). Recent amphibian declines have been reported from species rich tropical forest sites in Central and South America, and Australia, with minimal or no anthropogenic pressure (Alexander and Eischeid 2001; Pounds 2001; Blaustein *et al.* 2003). Infectious diseases partly explain this phenomenon, because it has now been established that pathogens with multiple hosts, biotic or abiotic reservoirs could infect species that are rare and cause disease, and even drive them to extinction (Lips 1999; Lips *et al.* 2006). The chytrid fungus – *Batrachochytrium dendrobatidis*, Iridoviridae group of viruses and pathogenic bacterial strains are known to cause catastrophic mortality of amphibians, decimating wild populations in many parts of the world (Richard *et al.* 2004; Densmore and Green 2007). It has been established that amphibians play an important role in ecosystem function (Whiles et al. 2006), and are sensitive to the quality of their environment (Relyea 2009). For this reason, they are referred to as fortuitous canaries, signalling problems in our environment. It is therefore important that studies on the ecology of amphibians report any adverse impacts on their population.

We present a report on the mass mortality of frogs from a site in Son Chiriya Wildlife Sanctuary. The site is located at Nalkeshwar, Forest Compartment number 373, at Ghatigaon, Son Chiriya Sanctuary, Gwalior, Madhya Pradesh, India (26.2° N; 77.8° E) at an elevation of 240 m above msl. The Sanctuary encompasses an area of 511 sq. km. The site where the mass mortality occurred has a perennial freshwater source from a spring on a hillock. The water trickled into small artificially made puddles that hold water temporarily for use by wildlife in the reserve. The entire area, including the spring and the temporary puddles, was spread over one hectare. It had no human activity and no apparent contamination of freshwater.

The first observation of mass mortality of frogs was made by the staff of the Sanctuary on March 21, 2009, where 30 individuals of the Indian Bull Frog *Hoplobatrachus*